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ABSTRACT

The effects of compensatory education programs in the United States during the past 20 years are discussed. The author believes the programs have had the least impact on scholastic achievement and intelligence quotient (IQ). The theoretical view of human intelligence and prevailing views of psychologists and educators of the 1960's regarding the nature of intelligence are believed to be incorrect. These views were the basis for the design and expectations of the compensatory education programs instituted 20 years ago. The error in the theory was that the disadvantage with which certain groups of children entered school was a deficiency in knowledge. Cultural differences in knowledge base have since been proven not to be the cause of lower scholastic achievement or IQ. Elementary cognitive processes and meta-processes should be considered in the design of compensatory education. Information processing deficits, rather than cultural differences in knowledge base, are considered by the author to be the major factors in poor scholastic achievement and IQ. (DWH)

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Cultural Deficit or Information Processing Deficit?

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The past 20 years has been a period of unparalleled affluence for public education and educational research in America. Two features which will stand out most prominently in the history of this era are racial desegregation of schools and large-scale experiments in compensatory education, such as Head Start.

Our educational resources during this period have been directed mainly toward extending the benefits of education to every segment of the population and, in particular, to those groups which historically have derived the least benefits from our traditional system of schooling.

During the last 20 years, the United States has exceeded all other nations in the years of schooling provided to its population. More young people have gone to school for more years and have obtained more diplomas, per capita, than in any other nation. Fifty percent of high school graduates in the 1970s went on to college.

These proud facts are one side of the picture. The other side is much less complimentary and should shake any complacency. This period of the most energetic large-scale innovations in the history of education also marks the 20-year period of accelerating decline in Scholastic Aptitude Test scores and other signs of malaise. In average level of educational achievement, objectively measured, the U.S. falls below all the other industrialized nations, according to the International Association for the Evaluation of Educational Achievement

(Lerner, 1983). Lower average levels of educational attainment are found only in the industrially underdeveloped nations of the Third World. Illiteracy in the U.S. has been grossly underestimated, until recently. The U.S. Census has routinely estimated the rate of illiteracy as the percentage of Americans with fewer than six years of schooling. The 1980 Census shows that two-tenths of one percent (0.2%) of the U.S. population between the ages of 14 and 24 years met this definition of illiteracy. The rate is the same for both black and white Americans. However, when simple tests of actual reading ability are used, a much less rosy picture is revealed. To quote lawyer-psychologist Barbara Lerner (1983), evidence collected by the National Assessment of Educational Progress shows that ". . . the overall rate of illiteracy for cohorts reaching their eighteenth birthday in the 1970s can safely be estimated to have been at least 20%. . . . The black-white gap was still dramatic: 41.6% of all black 17 year-olds still enrollled in school in 1975 were functionally illiterate . . ." (p. 73). Lerner notes the broad implications of this finding: "On this basis, it would have seemed reasonable to predict serious shortages of literate workers throughout the 1980s and perhaps beyond, along with high levels of structural unemployment, particularly among younger black workers, and increasing difficulty in meeting economic competition from foreign countries with more literate work forces" (p. 74).

Hence, the conditions that originally gave rise to the aims and aspirations of compensatory education are as relevant today as they were 20 years ago. Undoubtedly, many lessons can be learned from assessments and meta-analyses of the results of 20 years of compensatory education. My present purpose is to point out what seems to me to be one of the

most important lessons. Although it is one of the clearest and apparently least debatable findings of the studies of compensatory education programs of all kinds, and although it has considerable implications for both theory and practice, it has been peculiarly soft-pedaled in most of the summaries of the outcomes of compensatory education.

I am referring to the fact that compensatory education has made its least impressive impact on just those variables it was originally intended (and expected) to improve the most, namely, IQ and scholastic achievement. In discussing these effects of compensatory education, I will not enter into the futile argument of whether the glass is "half full" or "half empty." It is the "halfness" aspect of the outcomes which seems to be agreed upon by virtually everyone who has reviewed the evidence.

The plain truth is that compensatory programs have not resulted in any appreciable, durable gains in the IQs or scholastic achievements of those to whom they have been administered. This is an important discovery in its own right, and the fact that we do not like it or that it was not what was expected does not diminish its importance or justify its being soft-pedaled. We are challenged to try to understand its implications for the theory of intelligence and its practical implications for education.

Let us not be distracted from trying to understand the discrepancy between the expected and the actual outcomes of compensatory education programs by the too easy out of retroactively revising our original expectations. We should gain more from our 20-years experience than merely a list of excuses for the disappointing discrepancy between

expectations and results.

There have been positive gains from Head Start and other compensatory education programs, to be sure. The fact that the bona fide benefits of compensatory education have not been of a primarily cognitive nature and are not much reflected in scholastic achievement per se should not detract from their social importance. Improvement of children's nutrition and medical and dental care are some of the positive results of Head Start and similar programs. Add to this the greater involvement of parents in their children's schooling, improved attitudes toward school, enhanced self-esteem of pupils, lessened behavior problems, a reduced rate of repeating grades, and--one of the clearest results of all--a smaller percentage of children placed in special education classes (Consortium for Longitudinal Studies, 1983; Zigler & Valentine, 1979).

These socially desirable outcomes have taken place in the absence of marked or lasting improvement in pupils' IQs or academic performance. The reduced rate of placement in special classes is most likely a result of teachers' and administrators' knowledge that a child was enrolled in Head Start or some other compensatory program, and is therefore less apt to be labeled as a candidate for "special education" than his or her social peers who were not in a compensatory program. Glass and Ellwein (1984) offer an insightful observation on this point in their review of As the Twig Is Bent, a book on the programs and follow-up results of the Consortium of Longitudinal Studies comprising eleven compensatory education studies: "The irony in this interpretation of the facts is that those whose ideas are represented in As the Twig Is Bent . . . see themselves as developmental psychologists molding the inner, lasting

core of the individual--one can almost visualize the cortical wiring they imagine being rearranged by ever-earlier intervention. And yet the true lasting effects of a child's preschool experiences may be etched only in the attitudes of the professionals and in the records of the institutions that will husband his or her life after preschool" (p. 274).

Even in those studies involving the most intensive and prolonged educational experience, the effects on IQ are relatively modest and subject to the "fade-out effect" within one to three years. This appears to be the case in the "Miracle in Milwaukee" study of Heber and Garber, who gave children deemed at risk for familial mental retardation intensive training for cognitive development from birth to school-age. But the details of the conduct of the Milwaukee Study and the follow-up of its outcomes have not appeared in any refereed scientific journals and are inaccessible to full and proper critical review. At present, this problematic study cannot be legitimately cited concerning the effects of early intervention on children's subsequent intelligence and scholastic achievement. Fortunately, a similar study in North Carolina, the Abecedarian Project (Ramey et al., 1976), which is still in progress, is being properly reported in the appropriate journals. It promises the kind of evaluation which the Milwaukee Study has failed to deliver. Children in the Abecedarian Project spend six or more hours a day, five days a week, 50 weeks a year, in a cognitive training program, from infancy to school age. IQ gains, measured against a matched control group at 3 years of age, look encouraging. But there is still a question of whether it is just the IQ itself that has been increased, rather than the g factor of intelligence, which the IQ test is intended

to measure and is the basis of its predictive and construct validity (Jensen, 1981; Ramey & Haskins, 1981).

The most scholarly, thorough, and up-to-date examination of the variety of experimental attempts to improve intelligence and other human abilities that I have found is the book, How and How Much Can Intelligence Be Increased, edited by Detterman and Sternberg (1982). (This book originated from a symposium at the AERA 1980 convention.) As I stated in my book review: "What this book may bring as something of a surprise to many psychologists who received their education in the 1950s and 60s, in the heyday of what has been termed 'naive environmentalism' in American educational psychology, is the evident great difficulty in effecting practically substantial and durable gains in individuals' intelligence. In terms of some conceptions of human intelligence as predominantly a product of cultural learning, this fact should seem surprising. . . . The sum total of the wide-ranging information provided in this book would scarcely contradict the conclusion that, as yet, investigators have not come up with dependable and replicable evidence that they have discovered a psychological method by which they can increase 'intelligence' in the sense of Spearman's g" (Jensen, 1983, p. 757).

Thus, present claims regarding the plasticity of human intelligence are notably more subdued than were the promises of only 20 years ago. Edward Zigler, one of the founding fathers and leaders in compensatory education has recently warned, "Workers in the field must be on guard never again to make the errors of overpromising and overselling the positive effects of early childhood intervention" (Zigler & Berman, 1983, p. 897).

So as not to be accused of caricaturing the beliefs that prevailed at the beginning of the compensatory education movement and motivated its great expectations, I will quote again from Zigler and Berman (1983). As apologists for compensatory education, they have nevertheless surveyed the history and developments in this field with critical objectivity. Commenting on the beginning of preschool intervention in the 1960s, they state, "It was widely believed that a program of early environmental enrichment would give lower SES children the boost they needed to perform on a par with their middle SES peers. Intervention was supposed to impart immediate benefits so that class differences would be eliminated by the time of school entry. Furthermore, many expected that the brief preschool experience would be so potent a counteraction to the deficits in poor children's lives that it could prevent further attenuation in age-appropriate performance and a recurrence of the gap between social classes in later grades" (Zigler & Berman, 1983, p. 895). "What we witnessed in the 1960's was the belief that intelligence quotients can be dramatically increased with minimal effort" (p. 896). What is probably Zigler's and Berman's most perceptive comment: "Unfortunately, 'knowing more' was easily translated into 'becoming smarter' . . ." (p. 896). Elsewhere, Zigler describes the thinking in the early days of Head Start, of which he was one of the founding fathers: ". . . J. McV. Hunt, Benjamin Bloom, and others constructed for us a theoretical view that conceptualized the young child as possessing an almost unlimited degree of plasticity. Joe Hunt continued to assert that the norm of reaction for intelligence was 70 IQ points . . . and that relatively short-term intervention efforts could result in IQ gains of 49 or 63 points. With such environmental

sugarplums dancing in our heads, we actually thought we could compensate for the effects of several years of impoverishment as well as innoculate the child against the future ravages of such impoverishment, all by providing a six- or eight-week summer Head Start experience" (quoted by Skerry, 1983, p. 21).

This theoretical view of human intelligence, which governed the design and expectations of the compensatory programs beginning in the 1960s, has been put to the test during these past 20 years. The outcome appears remarkably clear. The prevailing views of most psychologists and educators in the 1960s regarding the nature of intelligence, and of what it is that our IQ tests mainly measure, and of why the IQ is so highly predictive of scholastic performance, as it turns out, were mostly wrong.

The error was the theory that the disadvantage with which certain classes of children entered school, and which compensatory education was intended to remedy, was mainly a deficiency in knowledge--knowledge possessed by the majority of white and middle-class children but lacking in many children from poor or culturally different backgrounds. Implicit in this theory is the view of intelligence as consisting of a general learning ability of almost unlimited plasticity plus the knowledge contents of memory, particularly those kinds of knowledge with positive transfer to scholastic performance. The informational content of IQ tests was seen as an arbitrary sample of the specific items of knowledge and skill normally acquired in the culture of the white middle and upper classes. In this highly behavioristic conception of intelligence, which I (Jensen, 1984) have elsewhere termed the specificity doctrine, intelligence is closely identified with the item

contents of the tests which psychologists have devised for assessing intelligence, for example, general information, vocabulary, arithmetic, ability to copy certain geometric figures, make block designs, work puzzles, and the like. Acquiring the knowledge and skills to do these things, or learning other similar things that would have positive transfer to performance on IQ tests and to school subjects, is to become more intelligent. As Zigler and Berman (1983, p. 596) put it, "'knowing more' was easily translated into 'becoming smarter.'"

Striking evidence from two recent lines of research contradicts this view of individual and group differences in intelligence as primarily differences in knowledge: (1) research on test bias and (2) research on mental chronometry.

The extremely high consistency of the relative item difficulties of IQ and achievement test items in different American-born, English-speaking ethnic and social class groups, and the nonexistence of differential predictive validity of standard intelligence and aptitude tests in various groups, are highly inconsistent with a hypothesis of cultural differences in the knowledge base sampled by these tests. The present evidence from studies of test bias renders as extremely implausible the explanation of racial and social class differences in terms of cultural differences in knowledge-base or differential opportunity for acquiring the content sampled by existing tests. Highly diverse test items maintain the same relative standing on indices of item difficulty within every American-born social class and racial group, regardless of the items' rated culture loadings. This phenomenon requires an explanation of group differences at some more basic level than that of cultural differences in exposure to the various kinds of

knowledge sampled by standard tests.

The answers, I believe, must be sought at the level of information processing. In recent years, the theory and technology of research on cognitive processes has afforded a powerful means for analyzing individual and group differences in abilities. The questions that can be investigated are at a quite different and more basic level of analysis than is permitted by traditional psychometric tests and the factor analysis of such tests. Mental chronometry, or measurement of the time required for various mental events in the course of information processing, permits investigation of individual differences at the level of elementary cognitive processes--the mechanisms through which individuals attain the complex learning, knowledge, and problem-solving skills sampled by IQ tests.

The tasks used to measure individual differences in various cognitive processes are devised so as to rule out or greatly minimize individual differences in knowledge. The tasks are so simple and the error rates so close to zero that individual differences can be studied only by chronometric techniques. The cognitive tasks in our laboratory, for example, are so easy as to require typically less than one second to perform (Jensen, 1980, 1982a, 1982b). Yet these very brief response latencies, derived from a number of elementary processing tasks, together can account for some 70 percent of the variance in untimed standard psychometric tests of intelligence. Consequently, not much of the true-score variance in such tests can be attributed to their knowledge content per se. The items of standardized psychometric tests are mainly vehicles for reflecting the past and present efficiency of mental processes; it is only an incidental and apparently nonessential

feature of these vehicles that they usually have some knowledge content. The fact that individual differences on such content-loaded tests are correlated with response latencies in elementary cognitive processing tasks that have minimal intellectual content means that our standard IQ tests (and the scholastic achievement tests with which the IQ is highly correlated) reflect individual differences in the speed and efficiency of basic cognitive processes more than they reflect differences in the informational contents to which people have been exposed. In fact, we can account for some substantial portion of the IQ variance by measuring the evoked electrical potentials of the brain by means of an electrode attached to the scalp--a measure which is not only free of any knowledge content but is not dependent upon any voluntary or overt behavior by the subject (Hendrickson & Hendrickson, 1980).

Hence I would suggest that the design of compensatory education and the assessment of its effects should be informed by the recent studies of information processing. The variables measured in this field so far have shown correlations not only with IQ but with scholastic achievement (e.g., Carlson & Jensen, 1982). An important question for research concerns the proportions of variance in IQ and scholastic achievement that are associated, respectively, with elementary cognitive processes and meta-processes, and what effects various types of compensatory training may have on these two levels of cognitive processes. Elementary cognitive processes comprise variables such as perceptual speed, stimulus scanning, stimulus encoding, mental rotation or transformation of visual stimuli, short-term memory capacity, efficiency of retrieval of information from long-term memory, generalization, discrimination, comparison, transfer, response execution, and the like.

Meta-processes comprise planning and executive functions which select and coordinate the deployment of the elementary cognitive processes with respect to specific problems: problem recognition, strategies for selecting and combining lower processes, organization of information, allocation of time and resources, and monitoring one's own performance. Although meta-processes are currently thought to be more amenable to improvement through training than the elementary processes, there is as yet no solid evidence on this question. And although much is already known about social class and racial group differences in IQ and scholastic achievement, psychologists have scarcely begun to try to understand the nature and locus of these differences in terms of the kinds of cognitive processes and meta-processes I have just mentioned (e.g., Borkowski & Krause, 1983; Vernon & Jensen, in press). As yet, virtually nothing is known about the effects of compensatory education on the various levels of cognitive processing or of the extent to which they may be influenced by training specially designed for that purpose.

It is my conjecture that some substantial part of the individual differences variance in IQ and scholastic achievement--probably something between 50 and 70 percent, as suggested by the present best evidence on the heritability of IQ--will continue to elude manipulation by any strictly psychological or educational treatment. The reason, I presume, is that the main locus of control of that unyielding source of variance exists more at a biological than at a psychological or behavioral level.

At an even more fundamental, philosophic level, we may wonder why variance in intelligence should be so surprisingly resistant to experimental manipulation. As I have suggested elsewhere (Jensen,

1983), it may seem less surprising if we view human intelligence from the standpoint of its biological evolution. Genetic variation is the absolutely essential raw material for the evolutionary process. If intelligence has evolved as a fitness character in the Darwinian sense, that is, as an intrumentality for the survival of Homo sapiens, it could well be that its biological basis has a built-in stabilizing mechanism, like a gyroscope, affording some degree of homeostatic autonomy in the ontogeny of mental development, so as to safeguard the individual's behavioral capacity for coping with the exigencies of survival. Mental development then would not be wholly at the mercy of often erratic environmental happenstance. A too plastic malleability of a fitness trait would afford the organism too little protection against the vagaries of its environment. Hence, along with the evolution of intelligence, there may also have evolved homeostatic processes which buffer the semiautonomous ontogeny of human intelligence against being pushed too far in one direction or the other, either by adventitiously harmful or by intentionally benevolent environmental forces.

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